APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/529,891	07/26/2005	Takako Yamaguchi	00684.003654.	7802

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EXAMINER
JELSMA, JONATHAN G

ART UNIT	PAPER NUMBER
1795	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

	Application No.	Applicant(s)
Office Action Summary	10/529,891	YAMAGUCHI ET AL.
	Examiner	Art Unit	
	Jonathan Jelsma	1795	

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on _22 June 2009_.

2a) ☐ This action is **FINAL.**   2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) _15 and 16_ is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) _15-16_ is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a) ☐ All b) ☐ Some * c) ☐ None of:

      1. ☐ Certified copies of the priority documents have been received.

      2. ☐ Certified copies of the priority documents have been received in Application No. _____.

      3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Summary

1.   This is the initial office action based on application 10/529,891 and in response to

Request for Continued Examination filed 06/22/2009.

2.   Claims 15-16 are previously pending. Claims 15-16 have been amended, all

amendments have been entered. Claims 15-16 are currently pending and have been

fully considered.

Claim Rejections - 35 USC § 102 and 103

3.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5.   The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining

obviousness under 35 U.S.C. 103(a) are summarized as follows:

    1.   Determining the scope and contents of the prior art.
    2.   Ascertaining the differences between the prior art and the claims at issue.
    3.   Resolving the level of ordinary skill in the pertinent art.

     4.   Considering objective evidence present in the application indicating
           obviousness or nonobviousness.

6.   Claims 15-16 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the

alternative, under 35 U.S.C. 103(a) as obvious over ALKAISI ("Nanolithography in the

Evanescent Near Field" Advanced Materials 2001, 13, No. 12-13, July 4).

7.   ALKAISI teaches an exposure mask, and method of making the mask, for

forming an image on a photoresist on a substrate (page 879, section 3). The mask with

opaque regions is used in an exposure method, using UV illumination, from a source

such as a laser (page 878, section 1 paragraph 2), utilizing the near field diffraction

effects to create an image in the photoresist coated substrate beyond the diffraction limit

of the projection lithographic system, the pattern transfer with the resist is produced by

exposure and development (page 879 section 3, and see figure 1). The exposure mask

comprises opaque regions with gratings, such as dense or isolated lines (page 880

paragraphs 1-2). ALKAISI then teaches a simulation and model of the mask based on

the pitch and thickness of the medium to be imaged in order to simulate and model the

diffraction in the evanescent near field of the metallic gratings (page 883 section 6.1,

paragraphs 1-2).

8.   ALKAISI teaches an optical photoresist thickness of 60 nm (page 880 section 4

paragraph 1) where the photoresist is the layer where the image is to be produced, so T

= appx 60 nm. The line width (W) may then be produced by less than 50 nm (page 880

section 4 paragraph 2). Figure 5b then shows 280 nm period (P) with 70 nm apertures

(D), forming a width of the light blocking member (K) being 210 nm (page 881

paragraph 1). Additionally the photoresist may go through further processing to give a

uniform thickness of 45nm (T") (page 882 section 5.2 paragraph 2 – page 883 paragraph 1). Therefore the value of 210nm > (50nm + 2*60nm)= 170nm, and 70nm < (280nm – 50nm – 2*60nm) = 110nm. Similarly 70nm = (280nm – 50nm – 2*60nm*(1 + α) = 110nm, where α = 1/3, and (50nm + 2*60nm) < (280nm – 70nm). Also 50nm < (280nm – 70nm – 2*45nm).

9.   ALKAISI teaches a simulation using electromagnetic technique to study the near-field region behind conducting gratings (page 883 section 6). Specifically, the electromagnetic fields are approximated by a set of functions, coefficients are determined for these basis functions based on the boundary conditions, then a full vector solution can be found at any point (page 883 section 6.1, paragraph 1). Specifically figure 11 shows the results of a contour plot (concentric circles) of the normalized electric field intensity.

10.   The electromagnetic technique to study the near field, and the approximation by a set of functions to find a full vector solution may form a model including concentric circles (page 883 section 6.1 paragraph 1). Similarly Figure 11(a) shows the results of the contour plot of the normalized electric field intensity, and from that it can be seen that at small values it may be approximately concentric circles. So therefore, the teaching of approximating an electrical field model extending circularly concentric may already be done by the teachings of ALKAISI, in the alternative, since ALKAISI does not explicitly teach the concentric circles, one having ordinary skill in the art would be able to choose various models for approximating the electric field.

Response to Arguments

11.   Applicant's arguments filed 06/22/2009 have been fully considered but they are
not persuasive.

12.   On page 6 first full paragraph of Applicant Arguments/Remarks, Applicant argues
that ALKAISI teaches nothing about approximating an electrical field distribution based
on a concentric circle model about an edge of a light blocking layer. Specifically
Applicant argues that figure 11(a) of the ALKAISI article provides no suggestion or
teaching with respect to a relationship of a distribution of an electrical field and
concentric circles. This argument is not persuasive.

13.   ALKAISI teaches approximating the electromagnetic field based many different
mathematical models, such as the Maxwell functions, in order to obtain a vector solution
to simulate the electromagnetic field (page 883 section 6.1, paragraph 1). This is then
graphically pictured, for instance in figure 11(a) which shows the contour plot of the
normalized electric field intensity. While it is true that the details in ALKAISI are not
specific enough to absolutely determine if the model being used does in fact teach
concentric circles, the examiner again puts forth that at least for small values the electric
field simulation would have the shape of concentric circles. In the alternative, if the
models of ALKAISI do not teach "an electric field model extending circularly concentric"
as is claimed, it would have been obvious to do so. ALKAISI teaches the method of
simulating the electric field using a model, therefore, it would have been obvious to
choose whatever model would best function for use in the method of ALKAISI.
Therefore, using a concentric circle model would have been obvious.

Conclusion

14.   Any inquiry concerning this communication or earlier communications from the
examiner should be directed to Jonathan Jelsma whose telephone number is (571)270-
5127. The examiner can normally be reached on Monday to Thursday 7:00 a.m. - 4:00
p.m.

15.   If attempts to reach the examiner by telephone are unsuccessful, the examiner's
supervisor, Mark Huff can be reached on (571)272-1385. The fax phone number for the
organization where this application or proceeding is assigned is 571-273-8300.

16.   Information regarding the status of an application may be obtained from the
Patent Application Information Retrieval (PAIR) system. Status information for
published applications may be obtained from either Private PAIR or Public PAIR.
Status information for unpublished applications is available through Private PAIR only.
For more information about the PAIR system, see http://pair-direct.uspto.gov. Should
you have questions on access to the Private PAIR system, contact the Electronic
Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a
USPTO Customer Service Representative or access to the automated information
system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Mark F. Huff/
Supervisory Patent Examiner, Art Unit 1795

JGJ